Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

The Benefits of Delaying Fall Anhydrous Applications

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Farmers typically are anxious to get fall-applied anhydrous ammonia into the ground. Concerns about logistics and availability can pressure a farmer into moving up the date for application, a practice that increases the potential for over-winter loss of fertilizer nitrogen.

Many of you may be familiar with "50-degree" rule for anhydrous ammonia application. The old rule of thumb was that farmers in Northern Missouri should delay injection until average soil temperature at six inches was below 50 degrees Fahrenheit. We recently completed an evaluation of soil temperature data from across Missouri, Illinois and Iowa that indicates that farmers would benefit from delaying application until soils are cooler than 50°F, particularly in Northern Missouri and Central Illinois.

The objective with fall-applied anhydrous ammonia is to apply into a cold soil to prevent the conversion of ammonium to nitrate. Injected anhydrous is attracted to soil particles preventing leaching losses. In warm soil anhydrous converts to nitrate, a form of nitrogen prone to leaching and denitrification. Soil temperature needs to be at or below freezing to fully eliminate conversion to nitrate.

The 50-degree rule comes from Minnesota, Iowa and other states farther north than Missouri. There are significant differences in over-winter soil temperature patterns in Northern Missouri compared to Iowa and Northern Illinois. We typically have warm weather at some time in January and February that allows soil temperature to rise well above freezing and soil temperatures rarely fall much below freezing. Farther north soil temperature frequently is below 32 degrees Fahrenheit and rarely rises above freezing. These warm weather events in winter make fall-applied nitrogen less stable in Missouri compared to our northern neighbors.

Northern Missouri farmers can compensate for some of the differences by delaying anhydrous ammonia injection until soil temperatures are cooler. Using a 40-degree rule compensates for many of the differences between central Iowa and Northern Missouri. The later you delay application the more likely the anhydrous will make it through the winter. Another approach to extending the application window is to add a nitrification inhibitor like N-Serve with your nitrogen fertilizer.

The down side to delaying application is that weather conditions can change making application difficult. Waiting for soil temperatures to approach 40°F may delay application a month. In a typical year average six-inch soil temperature at Novelty Missouri reaches 50°F around October 27th and 40°F around November 24th.

Fall applied anhydrous ammonia is not considered a best management practice anywhere in Missouri. Preplant and sidedress applications are preferred because they minimize potential losses of applied nitrogen. If you choose to apply anhydrous ammonia in the fall, take steps to limit potential losses by delaying application until six-inch soil temperatures approach 40°F and by using a nitrification inhibitor. Limiting fall anhydrous ammonia applications to less than half of planned corn and milo acres will also help to manage risk.

Six-inch soil temperature at nine Central and Northern Missouri locations is updated daily at the Web site http://agebb.missouri.edu/weather/reports/soysoil6.asp.

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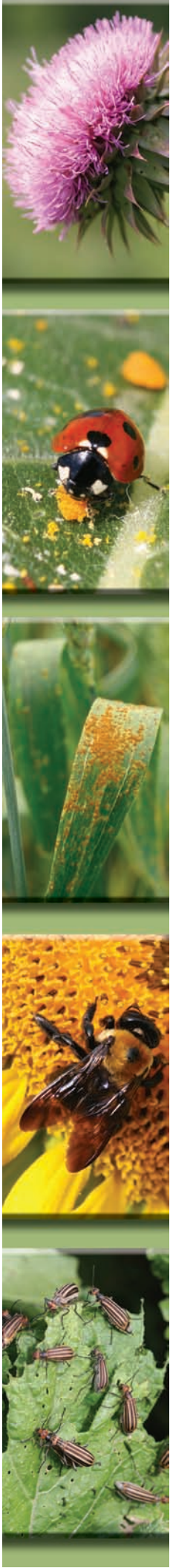

Stand Problems in Winter Wheat

By Laura Sweets

We have been receiving some calls and samples related to poor winter wheat stands. In most cases, the symptoms are off-color, stunting or poor growth in parts of the field. In a few cases purple discoloration of the leaf tissues has also been mentioned. Thus far, there does not seem to be one primary cause of the poor growth. Most samples have not shown symptoms of seed decay, seedling blight or root rot. In fact, on most samples the root system may be small but the roots look white and healthy. In two instances, damage appeared to be related to herbicide carry over. Several samples have been tested for wheat viruses but ELISA results were negative for all the common wheat viruses including barley yellow dwarf. In determining the cause of poor stands on winter wheat this fall, it is important to dig up plants and look for symptoms of seed decay, seedling blights and root rots; to check plants carefully especially in the crown area for aphids and to get a complete field history including information on prior crop, herbicides used, rainfall patterns, etc.

Various seedborne and soilborne pathogens can cause seedling diseases in wheat. Seed may be rotted before germination or developing seedlings may be infected before or after emergence. Stands may be thin or uneven. Seedlings may be yellow and stunted. Root systems may be poorly developed with root and crown tissue that is brown to black in color and soft or rotted. Severely infected seedlings may yellow, wilt and die. Seedling diseases tend to be more severe if poor quality or diseased seed is used for planting and if conditions at planting are not favorable for quick germination and stand establishment. Planting good quality, disease-free seed is the most effective means of preventing problems from seedborne pathogens.

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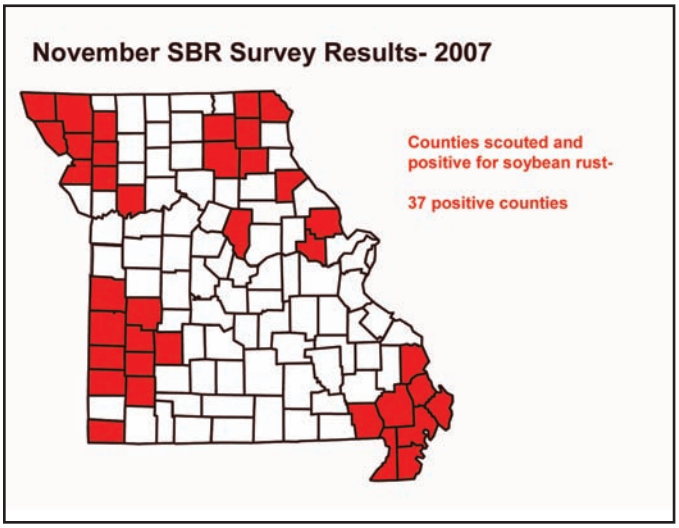
Soybean Rust Sentinel Plot Monitoring as of November 12, 2007

By Laura Sweets

Missouri has been participating in the Soybean Rust Sentinel Plot Program for the 2007 season. The distribution of the sentinel plots in Missouri was shown in the last issue of the Integrated Pest and Crop Management Newsletter. As the original sentinel plots matured and as soybean rust was confirmed in states adjacent to Missouri, several individuals made an effort to scout additional fields in as many Missouri counties as possible. As a result of this late season scouting effort soybean rust has been confirmed in 37 counties (soybean rust was confirmed on soybean in these 37 counties as well as kudzu in Ray County) in Missouri during the 2007 season. With harvest virtually complete and temperatures in the low 20s last week, scouting for soybean rust in finished for the 2007 season. A summary of the positive finds is given below.

On September 25, soybean samples from Pemiscot and Scott Counties (both in southeastern Missouri) were confirmed positive for soybean rust. Incidence and severity were low in both samples (3 infected leaflets out of 100 and 2 infected leaflets out of 100).

On September 28, soybean samples from Lawrence and Vernon Counties (both in southwestern Missouri) were confirmed positive for soybean rust. Incidence and severity were low in both samples with only a few pustules present on a few leaflets in each sample.



Since September 28, soybean rust has been confirmed in Jasper and Barton Counties in southwestern Missouri and in Dunklin, New Madrid, Mississippi, Stoddard and Butler Counties in southeastern Missouri. Incidence ranged from quite low to moderate in one Stoddard County field. Growth stage varies from R4/R5 in southwestern Missouri to R6 and beginning to drop leaves in southeastern Missouri.

On October 9 soybean rust was confirmed on a sample from Bates County in southwest Missouri. Both incidence and severity were quite low.

On October 11, soybean rust was confirmed on samples from Holt County both in northwest Missouri.

On October 19, soybean rust was confirmed on a soybean sample from Andrew County in northwest Missouri.

Between October 19-22, soybean rust was confirmed on soybean samples from Cedar, Dade, Polk, McDonald and Boone Counties.

On October 23, soybean rust was confirmed on soybean samples from Atchison, DeKalb, Clinton, Buchanan, Nodaway, Ray and St. Clair counties in northwest and west central Missouri. Soybean rust was also confirmed on a kudzu sample from Ray County,

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Corn and Soybean Planting Decisions

By Ray Massey

Corn futures started rising in October 2006 due to increased demand. The sight of $4 corn at planting time caused a huge swing in planted acres (almost 94 million acres planted in 2007 compared to 78 million acres in 2006). At the same time corn futures were increasing, soybean futures also started a steady uphill trend until they were in the $8 range by March of 2007. But the rise in soybean prices was not sufficient to dampen the move to corn acres and soybean acres planted fell from 76 million acres in 2006 to 64 million acres in 2007. The prices for soybeans continued to climb as prices for corn retreated some. While 2007 saw good money in both corn and soybeans, some wished they had not switched to corn, but had planted their normal rotation of soybeans.

The question as we enter 2008 is: "Is there more money to be made in corn or soybeans?" Will the pendulum swing again? If so, how far? If I knew the answer (and you thought I did), I probably wouldn't tell you because you might act upon it and cause the prediction to fail. So I will just give you some things to ponder as you decide whether to make some money or a lot of money. The good thing about this decision is that you likely are only leaving opportunity profits on the table as you pick up real profits, regardless of the choice you make.

Historically, the ratio of November soybean futures to December corn futures is about 2.5. Theoretically, this ratio should indicate a "break-even" point. If the ratio is less than 2.5, plant corn; if it is greater than 2.5, plant soybeans. Since we normally plant more soybeans than corn in Missouri, it might be argued that our local break-even is less—say 2.4. November 2008 soybeans settled at $9.82 on November 12 while December 2008 corn settled at $4.24. This gives a ratio of 2.3, or a plant corn sign. Those who are gambling on the price of corn and soybeans in 2008 are thinking farmers are going to repeat 2007 in reverse by making a pretty substantial shift from corn to soybeans, holding down the price of soybeans (if you can call $9.82 held down) and driving up the price of corn.

Perhaps a more thoughtful way to investigate the profit potential for corn and beans is to budget them out and compare their potential profit. The table below indicates that soybeans might be a better decision since they offer a net income of $165 to corn's $147.

	Corn	Soybeans
Yield	155	50
Price	$3.84 (Dec 2008 futures - $.40 basis)	$8.92 (Nov 2008 futures - $.80 basis)
Income	$595.20	$446.00
Expenses	$447.82	$281.47
Net income	147.38	164.53

The table above is brief and doesn't fit everyone's estimates of yield, prices and expenses. The numbers came from the budget generator developed by MU Food and Agricultural Policy Research Institute (FAPRI) for 2008 crops. It is a spreadsheet that allows the user to enter their estimates for yields, prices, inputs and expenses to arrive at their estimate of net income. I would recommend that readers download this spreadsheet from the Farmer's Corner section of the FAPRI Web site (http://www.fapri.missouri.edu/farmers_corner/tools/index.asp?current_page=farmers_corner) and estimate their own costs and returns to determine what is best to plant.

While I don't have the guts to give a crystal ball forecast of whether corn or soybeans offer better profit potential, I don't have any qualms about encouraging farmers to take advantage of the FAPRI budget generator to estimate their own profit potentials from both corn and soybeans. Of course, the big wildcard is what the price will be in 2008. Taking the time to do some strategic marketing of your 2008 production might yield some additional profit. If you are interested in improving your marketing, check out the FAPRI decisive marketing newsletter at http://www.fapri.missouri.edu/farmers_corner/mktng_newsletter/index.asp?current_page=farmers_corner. Mel Brees gives insightful information on market trends and strategies.

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Cleaning, Storing, Winterizing and Protecting Your Investment

By Bill Casady

After a long harvest, it's pretty easy to just pull machinery into a shed and forget it, but cleaning and winterizing equipment for storage through the winter is an investment of time that yields real returns.

Sprayers are an obvious problem as the weather turns colder. If you forgot about a sprayer, there may still be time to prevent permanent damage to some sprayer components. Although temperatures have already dipped below freezing, the short duration of sub-freezing temperatures may have prevented the formation of solid ice and damage to pumps and other components where water may collect.

Clean sprayers thoroughly before storing for the winter (Vol. 17, No. 14). For a complete guide to cleaning field sprayers refer to publication MU publication G4852 available online at http://extension.missouri.edu/explore/agguides/crops/g04852.htm. An antifreeze solution may be used to prevent freezing. Remember that the correct mixture of antifreeze with water provides maximum protection from freezing.

Take time to clean and lubricate combines and other equipment to preserve and protect them. Combines and other machinery containing grain, chaff and dust provide a haven for rodents and can lead to problems in long-term storage. It is sometimes possible to remove more than a bushel of grain even after a combine seems to be clean. Trapped grain attracts rodents, who often then make a meal of electrical wiring, leading to short circuits or other electrical problems.

Mouse-chewed upholstery in the cab may be little more than an annoyance, but it can lead to damage that is so bad that seats need to be replaced. Birds selecting a combine for its relative safety and source of food leave nests that can become a fire hazard. In many cases the damage to combines from rodents and birds is easily fixed, but it just makes more sense to prevent the damage in the first place.

Before performing any maintenance, always shut down the engine and remove the key. Then remove all panels and access doors to thoroughly clean any area where grain can become trapped. Make sure everyone in the work area clearly understands the dangers of belts and chains before rotating any component during maintenance.

Thoroughly remove debris, which can trap moisture and cause rust or corrosion. Compressed air is a great way to clean hard to reach places and is a better choice than water, especially on electrical components where corrosion can create a voltage drop that ultimately results in poor performance. When water is needed to clean surfaces, use only moderate pressure and mild soap. Avoid direct contact with seals when using high-pressure washers. Use compressed air after washing to help dry surfaces, and operate machinery for 10 to 20 minutes to help shed excess water from hard to reach places. Repaint worn surfaces with spray paint to protect from corrosion.

Combines sit idle longer than almost any other piece of equipment on the farm. Proper battery storage can protect batteries from deterioration. Even a small current drain can eventually discharge batteries and cause them to freeze in cold weather. Consider removing batteries to convenient storage where they can receive a periodic charge. Clean all connections and coat terminals with a thin layer of grease to prevent corrosion.

Finally, perform all routine maintenance including changing oil and oil filter, air cleaner, coolant, and fuel filters. Periodically drain water and consider using a lighter fuel and/or fuel stabilizers throughout the winter to keep fuel in good shape. Good cleaning and maintenance not only protect equipment from failure, they can increase resale value.

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White Grubs Damage Wheat and Grass Plantings

By Wayne Bailey

Several reports of white grub damage to winter wheat and fall planted grass pastures have been received during the past six weeks. In both crops, grub damage is generally seen as yellowed plants and poor stands. The grubs generally found causing damage to wheat during the fall are from the genus *Phyllophaga* and are commonly referred to as May or June beetles. They typically remain in the larval or grub stage from 1 to 3 years (many species have 2 year life cycles) and as adult beetles for 1 - 2 months during the summer. There are 200+ *Phyllophaga* species of beetles found in Missouri fields. In grass pastures grub problems can be caused by several grub species, but often Southern masked chafer or Northern masked chafer cause the most destruction to seedling grass stands. These grub species have a one year life cycle and are often referred to as "annual" white grubs.

Control of white grubs is often difficult to achieve once the damage has occurred. Few insecticides are labeled as rescue treatments for white grubs in field crops and getting insecticides to the target insects is often a challenge. Destroyed or damaged wheat stands can often be replanted or over-seeded during fall, although damage from grubs may occur until they move downward in the soil to overwinter.

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Soybean Rust Sentinel Plot Monitoring as of November 12, 2007 *continued from page 148*

Missouri. The kudzu in Ray County has been monitored all season long but rust was not identified on leaves from the site until mid-October. The identification of soybean rust on this kudzu sample was confirmed by microscopic examination of the leaves and through ELISA testing of infected plant tissue.

On October 24, soybean rust was confirmed on samples from Cape Girardeau County in southeast Missouri as well as Clark, Scotland and Macon Counties in northeast Missouri. All of these samples were from commercial fields with only scattered green leaves left through the field. Incidence and severity were low on all of these samples.

On October 30, soybean rust was confirmed on samples from Knox and Adair Counties in northeast Missouri.

On November 1, soybean rust was confirmed on samples from Gentry County in northwest Missouri and from Shelby County in northeast Missouri.

On November 2, soybean rust was confirmed on a sample from Ralls County in northeast Missouri.

On November 5, soybean rust was confirmed on samples from Lincoln and Warren Counties in east central Missouri.

Bottom-line: Soybean rust has now been confirmed in 37 counties in Missouri. Soybean rust was confirmed on soybeans in all 37 counties as well as kudzu in Ray County.

In most counties only one or two fields were checked per county and both the incidence and severity of soybean rust were low. Some fields in southwestern Missouri were in earlier stages of growth (due to late planting because of wet spring conditions) and were sampled for several consecutive weeks. Incidence and severity of rust did build up in these fields. In most cases the rust came in late enough in the season and the crop was far enough along that yield was not affected.

Sampling for the 2007 season is over. The soybean rust pathogen is an obligate parasite, i.e., it survives on living plant tissue. Since Missouri does not have live soybean plants in the field year round and since even the kudzu present tends to die back to the root system leaving no living leaf tissue during the winter months, it is very unlikely that soybean rust will overwinter in Missouri. The potential for soybean rust during the 2008 season will be dependent on how well rust overwinters in the southern United States, whether or not the southern United States has weather conditions favorable for the buildup of rust next year, whether or not weather patterns bring inoculum up to Missouri and what weather conditions and soybean growth stages are occurring when inoculum arrives in the state. Following information from southern states is crucial in evaluating if or when rust may present a risk to the soybean crop in Missouri. See the USDA Web site at www.sbrusa.net for up-to-date information on sentinel plot results from Missouri and the rest of United States.

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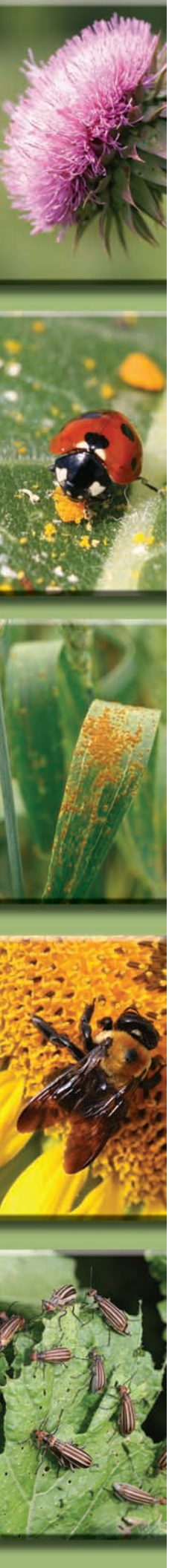
Commercial Pesticide Applicator Training

Coming January 2008

Pesticide applicator training helps reduce the harmful effects of improper pesticide use. The University of Missouri Extension Commercial Pesticide Program provides educational outreach for individuals who wish to become licensed commercial pesticide applicators. Licensed applicators must pass an exam and participate in continuing education courses on environmentally sound uses of pesticides.

For more information on training dates and registration, visit us on the Web at http://ppp.missouri.edu/pat



Weather Data for the Week Ending October 12, 2007

By Pat Guinan

Station	County	Weekly Temperature (Degrees Fahrenheit)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Nov 1-12-Nov	Departure from long term avg.	Apr. 1-Oct. 31	Departure from long term avg.
Corning	Atchison	60	34	71	23	47	4	0	-1.08	4131	769
St. Joseph	Buchanan	59	38	69	26	48	4	0.04	-0.8	4008	572
Brunswick	Chariton	59	34	72	20	47	2	0	-1.26	4037	539
Albany	Gentry	58	31	69	18	45	2	0	-1.08	3885	490
Auxvasse	Audrain	60	36	77	21	48	3	0.35	-1.13	4117	592
Columbia	Boone	61	37	78	21	49	3	0.94	-0.31	4226	537
Sanborn Field	Boone	61	39	78	23	50	3	0.94	-0.31	4441	655
Williamsburg	Callaway	61	36	78	20	49	4	0.76	-0.93	4160	676
Novelty	Knox	57	33	69	18	45	1	0.19	-1.28	3782	346
Linneus	Linn	58	33	69	16	46	3	0.04	-1.17	3889	556
Monroe City	Monroe	59	33	74	18	47	3	0.35	-1.06	3957	453
Versailles	Morgan	63	38	78	24	50	3	0.55	-0.75	4334	567
Green Ridge	Pettis	62	36	76	22	49	4	0	-1.4	4150	676
Lamar	Barton	65	41	76	26	52	4	0.25	-1.22	4214	243
Cook Station	Crawford	62	34	73	16	48	0	0.97	-0.66	3965	155
Alley Spring	Shannon	64	33	73	17	47	0	0.3	-1.45	3900	286
Round Spring	Shannon	63	33	73	18	46	-1	0.31	-1.43	3909	294
Mountain Grove	Wright	61	38	75	20	50	3	0.46	-1.33	*	*
Delta	Cape Girardeau	60	37	67	26	47	-2	0.34	-1.3	4421	237
Cardwell	Dunklin	64	39	74	29	51	0	0.03	-1.31	4796	248
Clarkton	Dunklin	62	39	72	27	50	0	0.04	-1.6	4794	300
Glennonville	Dunklin	62	41	71	28	51	1	0.05	-1.59	4769	306
Charleston	Mississippi	60	39	69	28	49	-1	0.54	-0.71	4715	571
Portageville-Delta Center	Pemiscot	62	42	71	31	51	0	0.03	-1.43	4991	511
Portageville-Lee Farm	Pemiscot	62	41	71	29	51	0	0.03	-1.39	4971	523
Steele	Pemiscot	63	41	73	30	51	0	0.43	-0.94	5087	604

** Complete data not available for report*

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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